

What is Claimed is:

1. An isolated nucleic acid encoding a glucose transporter protein selected from the group consisting of:

(a) isolated nucleic acid having the sequence given herein as **SEQ ID NO: 1**;

5 (b) isolated nucleic acids that hybridize to the complement of the sequence given herein as **SEQ ID NO: 1** under stringent conditions and encode an insulin-responsive glucose transporter; and

(c) isolated nucleic acids that differ from the sequences of (a) and (b) above due to the degeneracy of the genetic code, and encode a glucose transporter encoded
10 by isolated nucleic acids of (a) and (b) above.

2. An isolated nucleic acid according to claim 1 encoding a mammalian insulin-responsive glucose transporter.

15 3. An isolated nucleic acid according to claim 1 encoding a human insulin-responsive glucose transporter.

4. An isolated nucleic acid according to claim 1 encoding a protein having the amino acid sequence given herein as **SEQ ID NO: 2**.

20 5. An isolated nucleic acid according to claim 1 having the sequence given herein as **SEQ ID NO: 1**.

25 6. A host cell transformed to contain an isolated nucleic acid according to claim 1.

7. A recombinant nucleic acid molecule comprising a promoter operatively associated with an isolated nucleic acid according to claim 1.

30 8. A host cell containing a recombinant nucleic acid according to claim 7.

9. A host cell according to claim 8, wherein said host cell expresses said glucose transporter protein.

001652292-083100

10. An isolated glucose transporter protein encoded by a nucleic acid according to claim 1.

11. An isolated glucose transporter protein according to claim 10 having the amino acid sequence given herein as **SEQ ID NO: 2**.

12. An antibody that specifically binds to a glucose transporter protein according to claim 10.

13. An antibody according to claim 12 that specifically binds to a glucose transporter protein having the amino acid sequence given herein as **SEQ ID NO: 2**.

14. An antibody according to claim 12, wherein said antibody is a monoclonal antibody.

15. An antibody according to claim 12 conjugated to a detectable group.

16. A method of screening substances as modulators of mammalian glucose transporter activity, comprising the steps of:

providing a candidate compound; then

contacting said candidate compound to (a) a glucose transporter protein encoded by a nucleic acid according to claim 1, or (b) a cell that contains and expresses said glucose transporter protein; and then

determining the presence or absence of biochemical activity of said candidate compound on said glucose transporter, the presence of biochemical activity indicating said candidate compound is a modulator of glucose transporter activity.

17. A method according to claim 16, wherein said biochemical activity is selected from the group consisting of binding, transporter translocation, responsiveness of said transporter to insulin, and transporter activity.

18. A method according to claim 16, wherein said biochemical activity is selected from the group consisting of inhibition and activation.

00652292-03100

19. A method according to claim 16, wherein said contacting step is carried out *in vitro* in a cell-free preparation comprising said glucose transporter.

20. A method according to claim 16, wherein said cell-free preparation
5 comprises a cell membrane preparation.

21. A method according to claim 16, wherein said contacting step is carried out *in vitro* in a preparation of cells that contain and express said nucleic acid.

10 22. A method of screening subjects for a glucose transporter disorder, comprising the steps of:

determining the presence or absence of a decreased GLUT10 activity in said subject, the presence of decreased GLUT 10 activity indicating said subject is afflicted with or at risk of developing a glucose transporter disorder.

15

23. A method according to claim 22, wherein said decreased activity is decreased activity as compared to a subject that carries a GLUT 10 genes elected from the group consisting of (a) the GLUT 10 gene having the sequence given herein as SEQ ID NO: 1, and (b) GLUT 10 genes that hybridize to the complement of the
20 sequence given herein as SEQ ID NO: 1 under stringent conditions and encode an insulin-responsive glucose transporter.

24. A method according to claim 23, wherein said determining step comprises the step of detecting a mutation in said GLUT 10 gene that decreases the expression
25 or activity of the encoded glucose transporter.

25. A method according to claim 24, wherein said detecting step comprises detecting the presence or absence of a single nucleotide polymorphism in the GLUT10 gene of said subject, said single nucleotide polymorphism selected from the
30 group consisting of (a) a guanine to adenosine transition at base pair 616 of the GLUT 10 coding sequence, and (b) a guanine to adenosine transition at base pair 859 of the GLUT 10 coding sequence;

the presence of said single nucleotide polymorphism indicating said subject is afflicted with or at risk of developing a glucose transporter disorder.

001580" 26225915

26. A method according to claim 22, wherein said glucose transporter disorder is diabetes.

5 27. A method according to claim 22, wherein said glucose transporter disorder is type 2 diabetes.

28. A method according to claim 22, wherein said determining step is carried out by collecting a biological sample from said subject, and then determining the
10 presence or absence of a decreased GLUT10 activity from said biological sample.

29. A method of screening compounds for the ability to be transported across the cell membrane of cells that naturally express a GLUT 10 glucose transporter, said method comprising the steps of:

15 providing a candidate compound; then

 contacting a glucose transporter protein encoded by a nucleic acid according to claim 1 with said candidate compound under conditions in which the transport of said candidate compound by said glucose transporter protein can be determined; and then

20 determining the presence or absence of transport of said candidate compound by said glucose transporter protein, the presence of transport indicating that said compound will be transported across the cell membrane of cells that naturally express a GLUT 10 glucose transporter.

25 30. A method according to claim 29, wherein said contacting step is carried out *in vitro* in a preparation of cells that contain and express said nucleic acid.

31. A method according to claim 29, wherein said contacting step is carried out *in vitro* in a cell-free preparation comprising said glucose transporter.

30

32. A method according to claim 29, wherein said cell-free preparation comprises a proteoliposome preparation.

33. A method of detecting a thyroid tumor in a subject, comprising:

09652292 "083100

detecting the presence or absence of increased expression of a GLUT 10 gene encoding a glucose transporter in the thyroid of said subject, said GLUT 10 gene selected from the group consisting of (a) the GLUT 10 gene having the sequence given herein as **SEQ ID NO: 1**, and (b) GLUT 10 genes that hybridize to the
5 complement of the sequence given herein as **SEQ ID NO: 1** under stringent conditions and encode an insulin-responsive glucose transporter;

increased expression of said GLUT 10 gene in the thyroid of said subject indicating said subject may be afflicted with a thyroid tumor.

10 34. A method according to claim 33, wherein said detecting step is carried out by collecting a biological sample from said subject.

35. A method according to claim 33, wherein said detecting step is carried out by administering an antibody that binds to said glucose transporter, said antibody
15 conjugated to a detectable group.

36. An oligonucleotide that hybridizes to a nucleic acid according to claim 1.

00552202 083100

but a1